

Air Quality in Alberta January to March, 2002

Alberta Environment continuously monitors air quality in Edmonton (three stations), Calgary (three stations), Red Deer, Fort Saskatchewan and Beaverlodge (35 km west-northwest of Grande Prairie). Air pollutants monitored at Alberta Environment stations include carbon monoxide, dust and smoke, oxides of nitrogen, ozone, total hydrocarbons, hydrogen

sulphide, sulphur dioxide, ammonia and particulates (PM₁₀ and PM_{2.5}). The Index of the Quality of the Air (IQUA) is calculated at the Edmonton, Calgary, Red Deer and Fort Saskatchewan stations. The IQUA converts air pollutant concentrations into *Good*, *Fair*, *Poor* and *Very Poor* air quality ratings.

Highlights

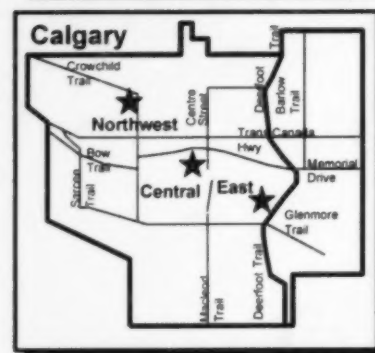
➤ **Good air quality was reported over 97 per cent of the time at Alberta Environment monitoring stations during the first quarter of 2002.** The frequency of *Good* air quality ranged from 97.7 per cent of the time at the Fort Saskatchewan station to 99.9 per cent of the time at the Edmonton Northwest station. *Fair* air quality was reported during the remaining time at most stations. *Good* air quality is the best possible rating and means that there are no known harmful effects to human or environmental health. *Fair* air quality indicates that there is adequate protection against harmful effects.

➤ **Two hours of *Poor* air quality were reported at the Calgary East station on January 21 (10:00 a.m. to noon).** *Poor* air quality at this time was caused by the combination of vehicle exhaust emissions and a strong temperature inversion that occurred in east Calgary on the morning of January 21. This air quality episode was relatively localized (confined to the Calgary East station) and short in duration. Air quality at the Calgary Central and Northwest stations was reported as *Good* during the morning of January 21. *Poor* air quality was not

reported at any other Alberta Environment monitoring stations in the first quarter of 2002. *Poor* air quality is rare in Calgary with only three hours recorded during the previous five years (1997 to 2001) in the first quarter. *Very Poor* air quality did not occur at any monitoring stations.



★ Air Quality Monitoring Station



For current air quality conditions call **427-7273** in Edmonton and **250-2099** in Calgary.

Alberta
ENVIRONMENT

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- **Elevated fine particulate (PM_{2.5}) levels were measured in the Edmonton area on January 30.** Daily averaged PM_{2.5} values on January 30 ranged from 31 µg/m³ (micrograms per cubic metre) in Fort Saskatchewan to 53 µg/m³ at the Edmonton Northwest station. The Canada-wide Standard (CWS) benchmark concentration for 24-hour PM_{2.5} concentrations is 30 µg/m³. Elevated PM_{2.5} levels on January 30 were caused by emissions from vehicles and other combustion sources during stable weather conditions.

- **Air quality guidelines for carbon monoxide, dust and smoke, nitrogen dioxide, ozone, sulphur dioxide and ammonia were not exceeded in the first quarter of 2002.** However, air quality guidelines for hydrogen sulphide were exceeded at the Calgary East and Red Deer stations. These exceedances were measured on January 7 (5 to 6 a.m. and 7 to 8 a.m.) at the Calgary East station and on

February 9 (3 to 5 a.m.) at the Red Deer station. The 24-hour guideline for hydrogen sulphide was also exceeded on January 2 at the Calgary East station. Exceedances at the Calgary East station were caused by the nearby sewage treatment facility. Elevated levels in Red Deer were likely caused by an industrial source located close to the monitoring station.

- **Concentrations of a number of pollutants were lower in the first quarter of 2002 compared to the previous ten years.** Carbon monoxide levels in the first quarter of 2002 were from 19 to 39 per cent lower than the ten-year average (1992 to 2001) in Edmonton and Calgary. Dust and smoke levels were 20 to 48 per cent lower in Edmonton than the previous ten years. Lower levels of dust and smoke and carbon monoxide at urban locations were primarily due to improved emission control devices on newer vehicles.

Number of Times Air Quality Guidelines were Exceeded - January to March, 2002

Station	Carbon Monoxide		Dust and Smoke	Hydrogen Sulphide		Nitrogen Dioxide		Ozone	Particulate	Sulphur Dioxide		Ammonia
	1-hour	8-hour	monthly	1-hour	24-hour	1-hour	24-hour	1-hour	24-hour PM _{2.5}	1-hour	24-hour	1-hour
Edmonton Central	0	0	0	na	na	0	0	0	1	na	na	na
Edmonton Northwest	0	0	0	na	na	0	0	0	1	na	na	na
Edmonton East	0	0	0	0	0	0	0	0	1	0	0	na
Calgary Central	0	0	0	na	na	0	0	0	0	na	na	na
Calgary Northwest	0	0	0	na	na	0	0	0	na	na	na	na
Calgary East	0	0	0	2	1	0	0	0	na	0	0	na
Red Deer	0	0	na	2	0	0	0	0	0	0	0	na
Fort Saskatchewan	0	0	0	0	0	0	0	0	1	0	0	0
Beaverlodge	na	na	na	na	na	0	0	0	na	0	0	na
Guideline	13 ppm	5 ppm	90% of values < 1 COH unit	0.01 ppm	0.003 ppm	0.212 ppm	0.106 ppm	0.082 ppm	30 µg/m ³ *	0.172 ppm	0.057 ppm	2.0 ppm

na Parameter not monitored at this location

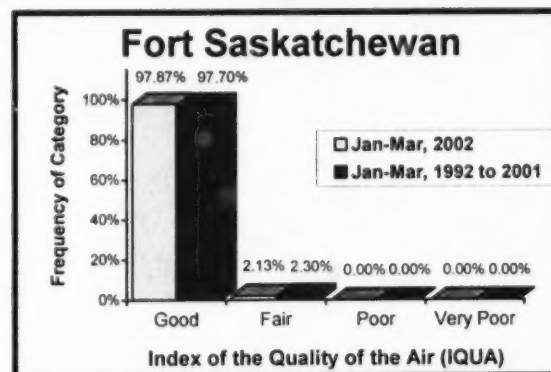
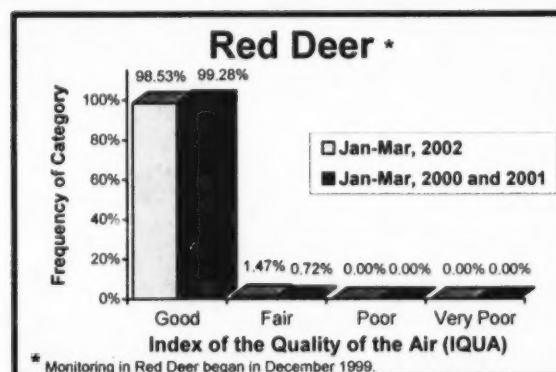
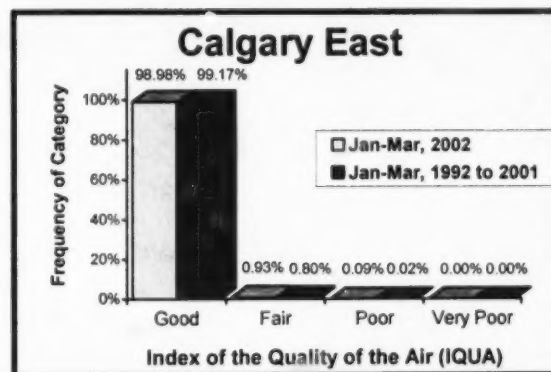
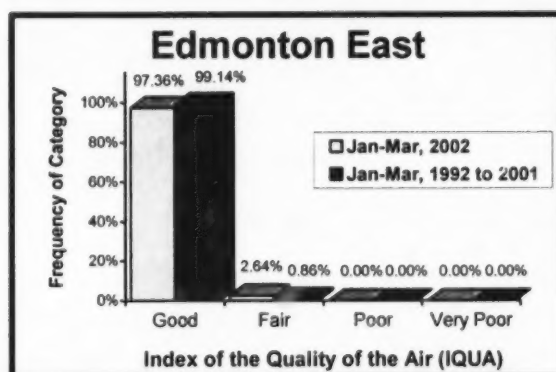
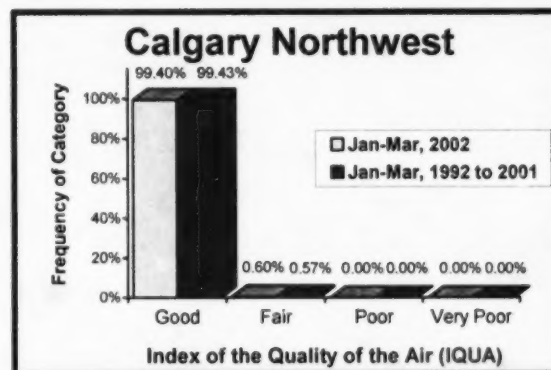
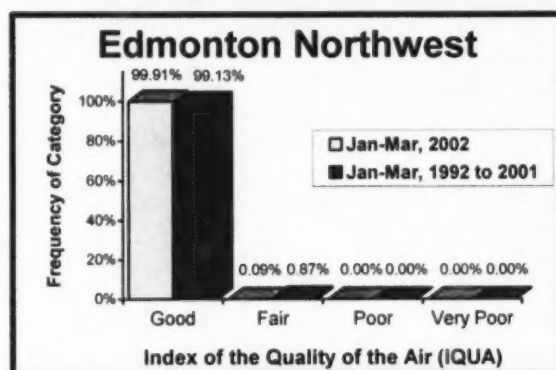
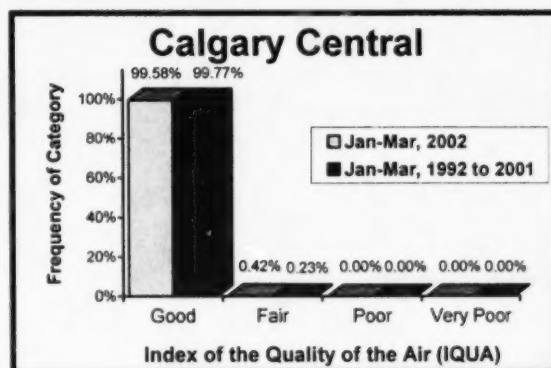
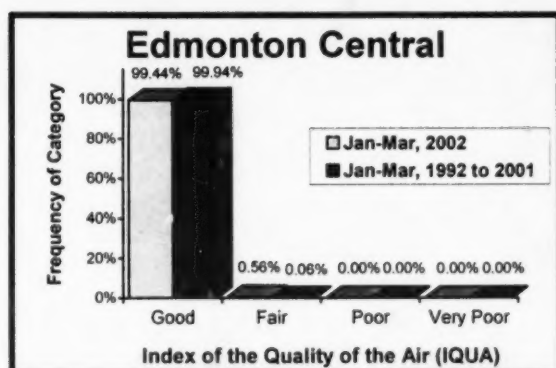
* The level and form of the achievement statistic specified the PM_{2.5} Canada-wide Standard is 30 µg/m³, for 24-hour averaging time, based on the 98th percentile annual value, averaged over three consecutive years (Canadian Council of Ministers of the Environment, 2001 Guidance Document on Achievement Determination: Canada-wide Standards for Particulate Matter (PM) and Ozone)

The Index of the Quality of the Air

The index of the quality of the air (IQUA) provides the public with a meaningful measure of outdoor air quality. The IQUA is calculated every hour at all Edmonton, Calgary, Red Deer and Fort Saskatchewan monitoring stations. From this index, we can effectively rate air quality as Good, Fair, Poor or Very Poor. Air pollutants used to calculate the IQUA are carbon monoxide, dust and smoke, nitrogen dioxide, ozone and sulphur dioxide. Good, Fair, Poor and Very Poor air quality categories are directly related to guidelines under Alberta's *Environmental Protection and Enhancement Act*, and National Ambient Air Quality Objectives.

IQUA rating	Description
Good	Desirable range: no known harmful effects to soil, water, vegetation, animals, materials, visibility or human health. The long-term goal is for air quality to be in this range all of the time in Canada.
Fair	Acceptable range: adequate protection against harmful effects to soil, water, vegetation, animals, materials, visibility and human health.
Poor	Tolerable range: not all aspects of human health or the environment are adequately protected from possible adverse effects. Long-term control action may be necessary, depending on the frequency, duration and circumstances of the readings.
Very Poor	Intolerable range: in this range, continued high readings could pose a risk to public health.

Source: Environment Canada, 1980. Guideline for a short-term air quality index. A report by the Federal-Provincial committee on Air Pollution.



Average Concentrations - January to March, 2002 ^a

Parameter	Monitoring Period	Edmonton Stations				Calgary Stations				Fort Saskatchewan	Beaverlodge ^c
		Central	Northwest	East	Central	Northwest	East	Central	Northwest		
Carbon Monoxide (ppm)	Jan-Mar 2002	0.77	0.74	0.46	0.76	0.45	0.75	0.51	0.55	0.45	na
	Jan-Mar 1992-2001	1.19	1.11	0.56	1.23	0.73	1.17	0.55	0.55	0.57	na
Dust and Smoke (COH unit)	Jan-Mar 2002	0.11	0.15	0.18	0.22	0.12	0.35	na	na	0.08	na
	Jan-Mar 1992-2001	0.20	0.26	0.22	0.23	0.11	0.33	na	na	0.14	na
Hydrogen Sulphide (ppm)	Jan-Mar 2002	na	na	0.001	na	na	0.001	0.001	0.001	0.000	na
	Jan-Mar 1992-2001	na	na	0.001	na	na	0.001	0.001	0.001	0.001	na
Nitrogen Dioxide (ppm)	Jan-Mar 2002	0.031	0.031	0.027	0.036	0.022	0.032	0.022	0.022	0.020	0.006
	Jan-Mar 1992-2001	0.034	0.030	0.025	0.038	0.023	0.034	0.021	0.021	0.020	0.006
Ozone (ppm)	Jan-Mar 2002	0.015	0.016	0.020	0.012	0.022	0.015	0.018	0.018	0.022	0.026
	Jan-Mar 1992-2001	0.013	0.015	0.020	0.011	0.020	0.013	0.020	0.017	0.023	0.029
Sulphur Dioxide (ppm)	Jan-Mar 2002	na	na	0.002	na	na	0.003	0.001	0.001	0.001	0.001
	Jan-Mar 1992-2001 ^d	na	na	0.003	na	na	0.004	0.001	0.001	0.003	0.001
Total Hydrocarbons (ppm)	Jan-Mar 2002	2.21	2.27	2.43	2.25	2.19	2.33	2.14	2.37	2.22	na
	Jan-Mar 1992-2001	2.45	2.28	2.52	2.28	2.16	2.32	2.37	2.14	2.14	na
Particulate (PM ₁₀ in µg/m ³)	Jan-Mar 2002	na	20.9	na	23.1	na	na	na	na	na	na
	Jan-Mar 1992-2001 ^e	na	22.1	17.1	29.1	na	na	17.0	na	na	na
Particulate (PM _{2.5} in µg/m ³)	Jan-Mar 2002	5.9	8.3	7.1	6.5	na	na	5.3	5.5	na	na
	Jan-Mar 1992-2001 ^f	8.0	13.2	8.6	11.2	na	na	7.5	na	na	na
Ammonia (ppm)	Jan-Mar 2002	na	na	na	na	na	na	na	na	0.003	na
	Jan-Mar 1992-2001	na	na	na	na	na	na	na	na	0.004	na

Maximum One-Hour Concentrations - January to March, 2002 ^a

Parameter	Monitoring Period	Edmonton Stations				Calgary Stations				Fort Saskatchewan	Beaverlodge	One-Hour Guideline
		Central	Northwest	East	Central	Northwest	East	Central	Northwest			
Carbon Monoxide (ppm)	5.7	5.7	5.7	2.7	6.5	3.1	5.3	3.8	3.8	na	na	13.0
Dust and Smoke (COH Unit)	0.9	1.4	1.5	2.1	0.8	4.7	na	na	0.6	na	na	na
Hydrogen Sulphide (ppm)	na	na	0.005	na	na	0.012	0.011	0.004	0.004	na	na	0.010
Nitrogen Dioxide (ppm)	0.087	0.114	0.076	0.106	0.081	0.123	0.064	0.074	0.074	0.037	0.037	0.212
Ozone (ppm)	0.059	0.048	0.071	0.052	0.061	0.054	0.063	0.067	0.067	0.053	0.053	0.082
Sulphur Dioxide (ppm)	na	na	0.032	na	na	0.020	0.021	0.018	0.018	0.016	0.016	0.172
Total Hydrocarbons (ppm)	5.4	6.3	12.6	4.2	3.1	4.1	5.1	6.5	na	na	na	na
Particulate (PM ₁₀ in µg/m ³)	na	159	na	196	na	na	na	na	na	na	na	na
Particulate (PM _{2.5} in µg/m ³)	112	120	123	54	na	na	31	80	na	na	na	na
Ammonia (ppm)	na	na	na	na	na	na	na	0.036	na	na	na	2.0

^a All average and maximum values based on data collected from January to March.

^b Monitoring at the Red Deer station began in December 1999.

^c Monitoring at the Beaverlodge station began in November 1997.

^d Sulphur dioxide monitoring began in February 1999 at the Beaverlodge station.

^e PM₁₀ monitoring began in January 1996 at the Calgary Central station and November 1993 at the Edmonton Northwest station.

^f PM_{2.5} monitoring began in November 1997 at the Calgary Central station, July 1998 at the Edmonton Northwest station, October 2000 at the Edmonton Central station, August 2000 at the Edmonton East station, December 2000 at the Red Deer station and November 2001 at the Fort Saskatchewan station.

^g Parameter not monitored at this location or no one-hour guideline for parameter.